

What is Claimed:

1. A solid state fuel cell comprising a non-polymeric electrolyte, the fuel cell further comprising a member having a porous region, the member comprising metallic titanium or an alloy thereof.
2. A fuel cell according to claim 1 wherein the fuel cell comprises ceramic.
3. A fuel cell according to claim 2 which is a solid oxide fuel cell.
4. The fuel cell according to claim 3 wherein the member further comprises a non-porous region.
5. The fuel cell according to claim 4 wherein the porous region is bounded by the non-porous region.
6. The fuel cell according to claim 3 wherein the member comprises an electrode.
7. The fuel cell according to claim 3 wherein the member supports an electrode.
8. A fuel cell according to claim 5 wherein the member supports an electrolyte.
9. A fuel cell according to claim 5 wherein the member supports one or more ceramic layers.
10. A fuel cell according to claim 9 wherein at least one of the one or more ceramic layers comprises cerium gadolinium oxide, yttria stabilised zirconia, nickel oxide/yttria stabilised zirconia cermet, nickel oxide/cerium gadolinium oxide cermet, lanthanum strontium cobalt ferrite /cerium gadolinium oxide, doped lanthanum manganate or mixtures thereof.
11. A fuel cell according to claim 9 wherein at least one of the one or more ceramic layers is an electrode.
12. A fuel cell according to claim 9 wherein at least one of the one or more ceramic layers is an interface layer.

13. A fuel cell according to claim 9 wherein at least one of the one or more ceramic layers is an electrolyte.
14. A fuel cell according to claim 5 wherein the member is a structural member.
15. A fuel cell according to claim 5 further comprising an interconnect comprising titanium or an alloy thereof.
16. A fuel cell according to claim 15 wherein the interconnect is in contact with the member.
17. A fuel cell according to claim 3 wherein the porous region comprises sintered metal powder.
18. A fuel cell according to claim 3 wherein the porous region comprises metal felt.
19. A fuel cell according to claim 3 wherein the porous region is formed by laser machining.
20. A fuel cell according to claim 3 wherein the porous region is formed by electrodeposition.
21. A fuel cell according to claim 3 wherein the porous region is formed by etching.
22. A fuel cell according to claim 21 wherein the etching is photochemical etching.
23. A fuel cell according to claim 21 wherein the etching is electrochemical etching.
24. A fuel cell according to claim 15 wherein either the member or the interconnect, or both, are formed by pressing.
25. A fuel cell according to claim 15 wherein either the member or the interconnect, or both, are formed by superplastic forming.
26. A fuel cell according to claim 15 wherein either the member or the interconnect, or both, comprise at least 98% titanium by weight.

27. A fuel cell according to claim 15 wherein either the member or the interconnect, or both, comprise at least 85% titanium by weight.
28. A fuel cell according to claim 15 wherein either the member or the interconnect, or both, comprise at least 76% titanium by weight.
29. A fuel cell according to claim 15 wherein either the member or the interconnect, or both, comprise at least 51% titanium by weight.
30. A fuel cell according to claim 15 wherein either the member or the interconnect, or both, comprise non-alloyed titanium.
31. A fuel cell according to claim 15 wherein either the member or the interconnect, or both, comprise a titanium alloy.
32. A fuel cell according to claim 31 wherein the titanium alloy is Ti-6Al-4V, Ti-3Al-2.5V, Ti-6Al-2Sn-4Zr-2Mo-0.08Si or Ti-15Mo-3Nb-3Al-0.2Si.
33. A fuel cell according to claim 15 wherein either the member or the interconnect, or both, comprise metal foil.
34. A protonic ceramic fuel cell comprising a non-polymeric electrolyte, the fuel cell further comprising a member having a porous region, the member comprising metallic titanium or an alloy thereof.
35. The fuel cell according to claim 34 wherein the member further comprises a non-porous region.
36. The fuel cell according to claim 35 wherein the porous region is bounded by the non-porous region.
37. The fuel cell according to claim 36 having an electrode comprising the member.
38. The fuel cell according to claim 36 wherein the member supports an electrode.
39. A fuel cell according to claim 36 wherein the member supports an electrolyte.

40. A fuel cell according to claim 36 wherein the member supports one or more ceramic layers.
41. A fuel cell according to claim 40 wherein at least one of the one or more ceramic layers comprises cerium gadolinium oxide, yttria stabilised zirconia, nickel oxide/ yttria stabilised zirconia cermet, nickel oxide/ cerium gadolinium oxide cermet, lanthanum strontium cobalt ferrite /cerium gadolinium oxide, doped lanthanum manganate or mixtures thereof.
42. A fuel cell according to claim 40 wherein at least one of the one or more ceramic layers is an electrode.
43. A fuel cell according to claim 40 wherein at least one of the one or more ceramic layers is an interface layer.
44. A fuel cell according to claim 40 wherein at least one of the one or more ceramic layers is an electrolyte.
45. A fuel cell according to claim 36 wherein the member is a structural member.
46. A fuel cell according to claim 36 further comprising an interconnect comprising titanium or an alloy thereof.
47. A fuel cell according to claim 46 wherein the interconnect is in contact with the member.
48. A fuel cell according to claim 34 wherein the porous region comprises sintered metal powder.
49. A fuel cell according to claim 34 wherein the porous region comprises metal felt.
50. A fuel cell according to claim 34 wherein the porous region is formed by laser machining.
51. A fuel cell according to claim 34 wherein the porous region is formed by electrodeposition.
52. A fuel cell according to claim 34 wherein the porous region is formed by etching.

53. A fuel cell according to claim 52 wherein the etching is photochemical etching.
54. A fuel cell according to claim 52 wherein the etching is electrochemical etching.
55. A fuel cell according to claim 46 wherein either the member or the interconnect, or both, are formed by pressing.
56. A fuel cell according to claim 46 wherein either the member or the interconnect, or both, are formed by superplastic forming.
57. A fuel cell according to claim 46 wherein either the member or the interconnect, or both, comprise at least 98% titanium by weight.
58. A fuel cell according to claim 46 wherein either the member or the interconnect, or both, comprise at least 85% titanium by weight.
59. A fuel cell according to claim 46 wherein either the member or the interconnect, or both, comprise at least 76% titanium by weight.
60. A fuel cell according to claim 46 wherein either the member or the interconnect, or both, comprise at least 51% titanium by weight.
61. A fuel cell according to claim 46 wherein either the member or the interconnect, or both, comprise non-alloyed titanium.
62. A fuel cell according to claim 46 wherein either the member or the interconnect, or both, comprise a titanium alloy.
63. A fuel cell according to claim 62 wherein the titanium alloy is Ti-6Al-4V, Ti-3Al-2.5V, Ti-6Al-2Sn-4. Zr-2Mo-0.08Si or Ti-15Mo-3Nb-3Al-0.2Si.
64. A fuel cell according to claim 46 wherein either the member or the interconnect, or both, comprise metal foil.

65. A solid state fuel cell comprising a non-polymeric electrolyte, and further comprising a plurality of members or interconnects, or both, each member having a porous region; the members and interconnect comprising metallic titanium or an alloy thereof.
66. The solid state fuel cell of claim 65 wherein the fuel cell is a solid oxide fuel cell or a protonic ceramic fuel cell.
67. The solid state fuel cell of claim 66 wherein at least one of the plurality of members supports one or more ceramic layers.
68. The solid state fuel cell of claim 67 wherein at least one of the one or more ceramic layers the ceramic layers comprises cerium gadolinium oxide, yttria stabilised zirconia, nickel oxide/ yttria stabilised zirconia cermet, nickel oxide/ cerium gadolinium oxide cermet, lanthanum strontium cobalt ferrite /cerium gadolinium oxide, doped lanthanum manganate or mixtures thereof.
69. The solid state fuel cell of claim 68 wherein at least one of the one or more ceramic layers is an electrotrode.
70. The solid state fuel cell of claim 68 wherein at least one of the one or more ceramic layers is an interface layer.
71. The solid state fuel cell of claim 68 wherein at least one of the one or more ceramic layers is an electrolyte.
72. The solid state fuel cell of claim 65 wherein the plurality of the members or interconnects or both comprise a titanium alloy, wherein the titanium alloy is Ti-6Al-4V, Ti-3Al-2.5V, Ti-6Al-2Sn-4Zr-2Mo-0.08Si or Ti-15Mo-3Nb-3Al-0.2Si.
73. The solid state fuel cell of claim 65 wherein one or more of the plurality of member, or interconnects, or both, comprise metal foil.